Highly pathogenic avian influenza

Aetiology Epidemiology Diagnosis Prevention and control References

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AETIOLOGY

Classification of the causative agent

Virus family Orthomyxoviridae, genus *Influenzavirus* A, B. To date, all highly pathogenic isolates have been influenza A viruses of subtypes H5 and H7

Resistance to physical and chemical action

Temperature:	Inactivation by 56°C/3 hours; 60°C/30 min
pH:	Inactivated by acid pH
Chemicals:	Inactivated by oxidising agents, sodium dodecyl sulphate, lipid solvents, ß-propiolactone
Disinfectants:	Inactivated by formalin and iodine compounds
Survival:	Remains viable for long periods in tissues, faeces and also in water

EPIDEMIOLOGY

- Highly contagious

Hosts

- Highly pathogenic avian influenza isolates have been obtained primarily from chickens and turkeys
- It is reasonable to assume all avian species are susceptible to infection

Transmission

- Direct contact with secretions from infected birds, especially faeces
- Contaminated feed, water, equipment and clothing
- Clinically normal waterfowl and sea birds may introduce the virus into flocks
- Broken contaminated eggs may infect chicks in the incubator

Sources of virus

- Faeces, respiratory secretions
- Highly pathogenic viruses may remain viable for long periods of time in infected faeces, but also in tissues and water

Occurrence

Apathogenic and mildly pathogenic influenza A viruses occur worldwide. Highly pathogenic avian influenza A (HPAI) viruses of the H5 and H7 HA subtypes have been isolated occasionally from free-living birds in Europe and elsewhere. Outbreaks due to HPAI were recorded in the Pennsylvania area, USA, in the years 1983-84. More recently outbreaks have occurred in Australia, Pakistan and Mexico. There is evidence that H5 viruses of low pathogenicity may mutate and become highly pathogenic. HPAI infections are very rarely seen, and should not be confused with viruses of low pathogenicity, which may also be of H5 or H7 subtypes

For detailed information on occurrence, see recent issues of *World Animal Health*

DIAGNOSIS

Incubation period is 3-5 days

Clinical diagnosis

- Severe depression, inappetence
- Drastic decline in egg production
- Facial oedema with swollen and cyanotic combs and wattles
- Petechial haemorrhages on internal membrane surfaces
- Sudden deaths (mortality can reach 100%)
- Virus isolation needed for definitive diagnosis

Lesions

Chickens

- Lesions may be be absent in cases of sudden death
- Severe congestion of the musculature
- Dehydration
- Subcutaneous oedema of the head and neck area
- Nasal and oral cavity discharge
- Severe congestion of conjunctivae, sometimes with petechiae
- Excessive mucous exudate in the lumen of the trachea, or severe haemorrhagic tracheitis
- Petechiae on the inside of the sternum, on the serosa and abdominal fat, serosal surfaces and in the body cavity
- Severe kidney congestion, sometimes with urate deposits in the tubules
- Haemorrhages and degeneration of the ovary
- Haemorrhages on the mucosal surface of the proventriculus, particularly at the juncture with the gizzard

- Haemorrhages and erosions of the gizzard lining
- Haemorrhagic foci on the lymphoid tissues in the intestinal mucosa

The lesions in turkeys are similar to those in chickens, but may not be as marked. Ducks infected with HPAI and excreting the virus, may not show any clinical signs or lesions

Differential diagnosis

- Acute fowl cholera
- Velogenic Newcastle disease
- Respiratory diseases, especially infectious laryngotracheitis

Laboratory diagnosis

Procedures

Identification of the agent

- Inoculation of 9-11-day-old embryonated chicken eggs followed by:
    - demonstration of haemagglutination
    - immunodiffusion test to confirm the presence of influenza A virus
    - subtype determination with monospecific antisera
    - strain virulence evaluation: evaluation of the intravenous pathogenicity index (IVPI) in 4-8-week-old chickens

Serological tests

- Haemagglutination and haemagglutination inhibition tests
- Agar gel immunodiffusion

Samples

Identification of the agent

- Tracheal and cloacal swabs (or faeces) from live birds or from pools of organs and faeces from dead birds

Serological tests

- Clotted blood samples or serum

PREVENTION AND CONTROL

No treatment

Sanitary prophylaxis

- Avoidance of contact between poultry and wild birds, in particular waterfowl
- Avoidance of the introduction of birds of unknown disease status into flock

- Control of human traffic
- Proper cleaning and disinfection procedures
- One age group per farm ('all in-all out') breeding is recommended

In outbreaks

- Slaughtering of all birds
- Disposal of carcasses and all animal products
- Cleaning and disinfection
- Allow at least 21 days before restocking

Medical prophylaxis

- In the past, it has been considered counterproductive to vaccinate against HPAI as some vaccinated individuals may, nonetheless, become infected and shed virulent virus. However, in the recent outbreaks in Pakistan and Mexico, inactivated vaccines have been employed to combat rapidly spreading disease

REFERENCES AND OTHER INFORMATION

- Reference experts and laboratories
- Classified as an OIE *List A* disease (A150)
- Chapter 2.1.14. in the *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals.*
- *Terrestrial Animal Health Code*
    - Other references - see the Index
- *World Animal Health*
- Current *Animal Health Status* (*Disease Information*)